



Safety Tech Industries

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September 28, 1998

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Kathryn Hosford  
Deputy Chief, Policy Branch  
Federal Communications Commission  
2025 M Street, NW  
Room 8010  
Washington, DC 20554

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FEDERAL COMMUNICATIONS COMMISSION  
OFFICE OF THE SECRETARY

Dear Ms. Hosford:

Safety Tech Industries has developed a very innovative communications system for the fire service. Our system is comprised of three components: an individual radio mounted on the firefighter's SCBA mask (totally wireless), crossband repeaters (mounted in each fire vehicle and hooked into the department's radio system), and a command console (installed in the departments command vehicle). The system provides a series of safety functions including: electronic accountability, hands-free team or group communications, push-to-talk communications for firefighter-to-command communications, emergency man-down button, temperature sensor, motion sensor, man-down homing signal, and others. (Please see the detailed feature description enclosed.)

We would like your assistance in helping us bring this system to its maximum benefit to firefighter safety. **Homing signals**, by their very nature, must be weak to enable a directional sensor to pinpoint the source of the signal. *We would like your assistance in having the FCC to reserve a specific signal in the new 746-806 band for us and any manufacturer developing a locating device to use for this purpose* (much like the signal used to locate downed aircraft.) If another public safety function used the same frequency it would overpower the homing signal and defeat its purpose, namely to rapidly locate a firefighter in trouble.

Another area where a reserved national frequency enhances the system is for **firefighter-to-firefighter communications**. For example a four-man hose team needs a low power frequency so that they can easily communicate amongst themselves. It cannot be high power because one team's talk will confuse communications with another team on site. (If the nozzle man on Team A in the front of a building called for more hose and this was heard by members of Team B in the back of the building, they might drag in hose unnecessarily and waste valuable time.) It is important for all firefighters to have the same frequency so that should members from another team be in close proximity they can

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"R e l i a b i l i t y . . . U n d e r F i r e."

also communicate. This is true whether they are from the same department or if two or more departments were responding to a mutual aid fire. These communications are at very low power (1 milliwatt for limited range and power conservation.) *We are seeking your assistance in having the FCC reserved a frequency for us and for any other manufacturer to use for firefighter-to-firefighter communications.* This is so other stronger signals on the same frequency do not override these signals.

Another area where a reserved national frequency enhances the system is for **firefighter-to-command voice and data communications and firefighter accountability.**

Everyone in the fire service acknowledges the need for better firefighter accountability. We have developed such a system. Our mask units transmit an identity code once the unit is turned on. This will identify specific firefighters on the commander's computer. However, stronger transmissions on the same frequency can block our system. *We are asking your help in reserving a special frequency for us and for any manufacturer developing an electronic accountability system for the fire service.* This will also assure that firefighters will be able to talk to command (and vice versa) regardless of other public safety communications in the area. This same frequency will be used to monitor temperature by each firefighter, firefighter motion and other data. In the future we will be able to monitor each firefighter's heart rate and location within the building.

I have enclosed several diagrams describing the major features of the MaskCom® system as well as complete descriptions of each feature currently offered in the product. I would be happy to speak with you to see how Safety Tech can work to enhance firefighter safety.

Sincerely,

A handwritten signature in black ink, appearing to read "Peter J. LaPlaca", written in a cursive style.

Peter J. LaPlaca, Ph.D.  
President

enclosures

INFORMATION ON THE  
MASKCOM® COMMUNICATION  
SYSTEM FOR FIREFIGHTERS

by

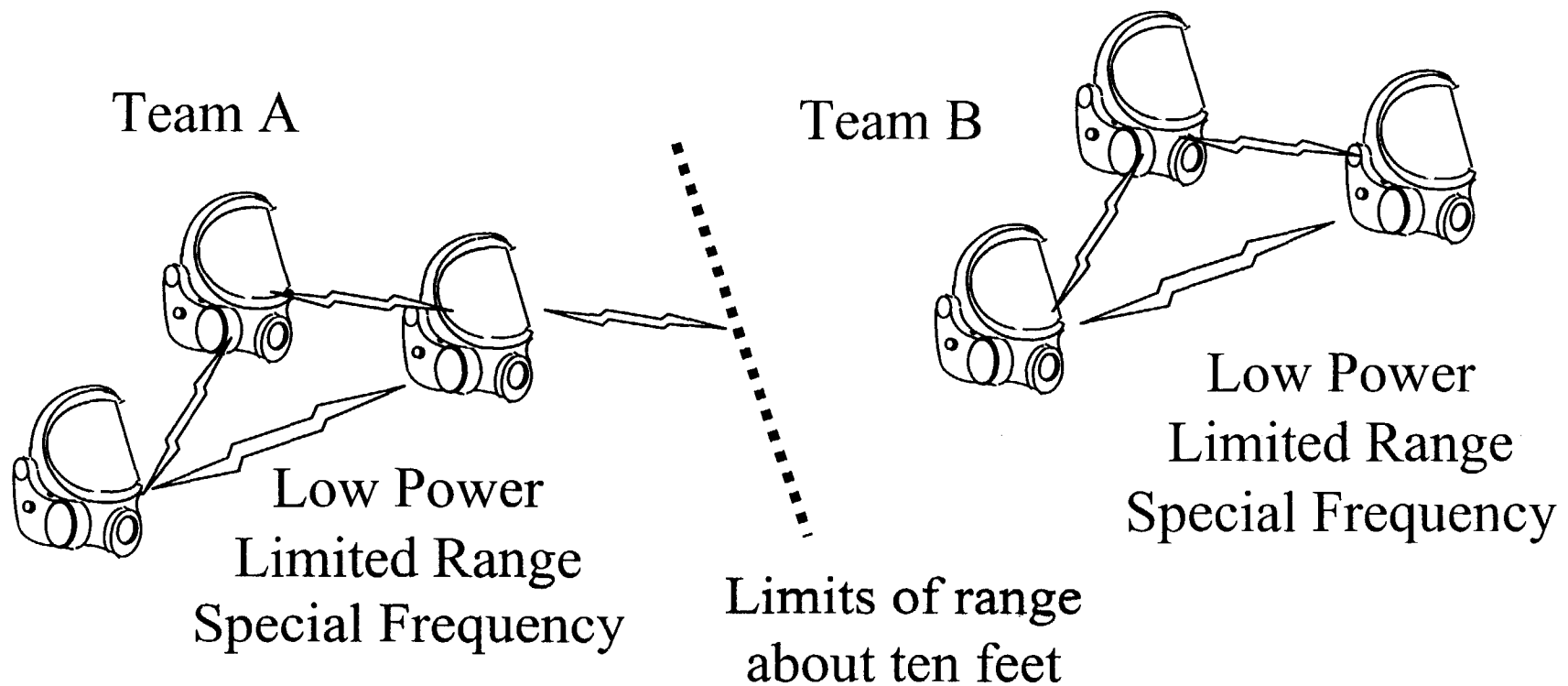
SAFETY TECH INDUSTRIES

## Features for MaskCom® Communications System

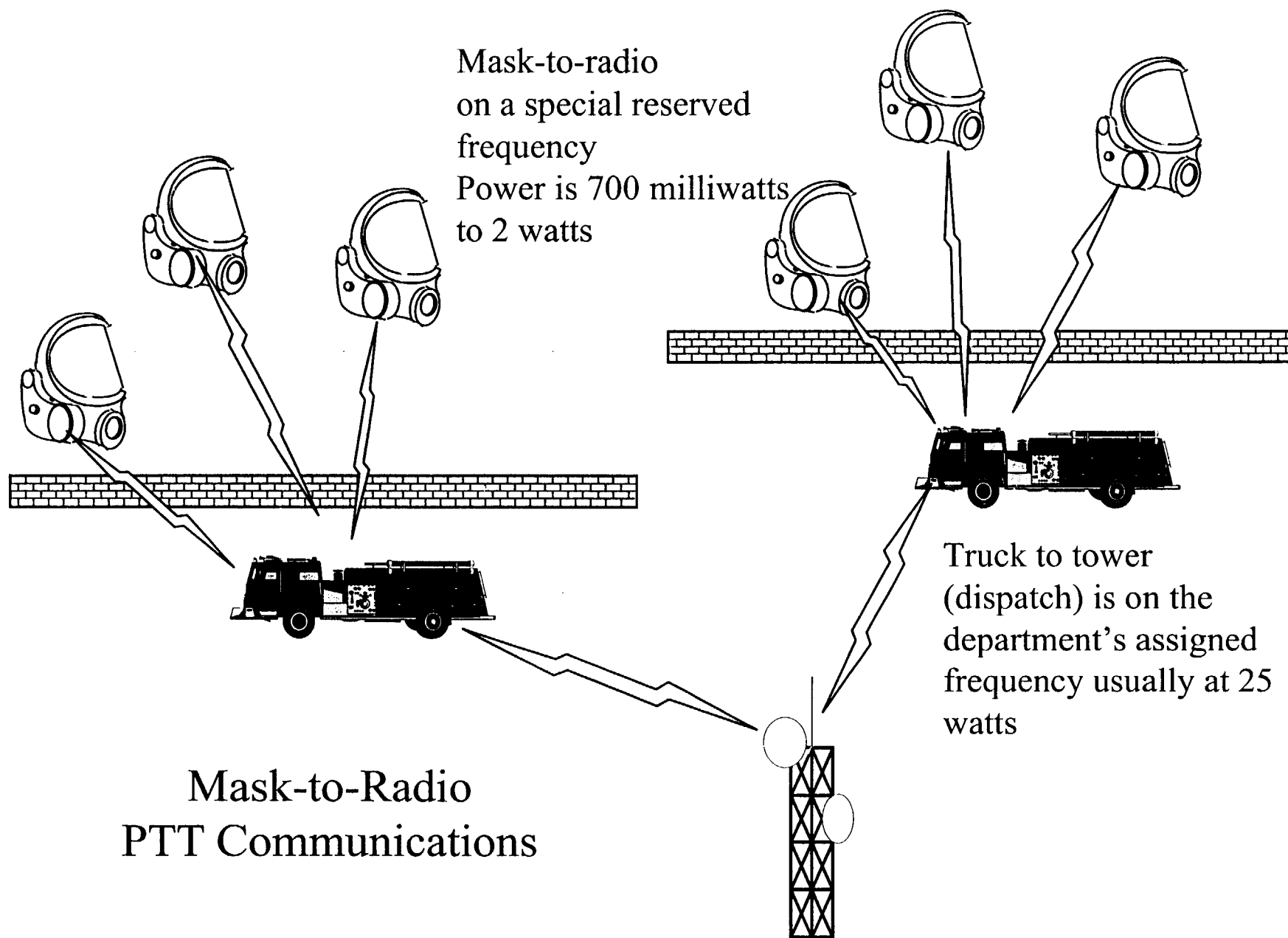
Feature	Description
<b>Communications</b>	
Mask-to-mask	Hands-free, voice-activated wireless communication under very low power. This is designed for a range of ten to fifteen feet for a three-to-five man team. The voice activation system incorporates Breath Clipper® technology to eliminate transmission of S.C.B.A. breathing sounds. Firefighters do not have to depress any push-to-talk button for Mask-to-Mask communications. If firefighters from a different team are within the range, they will also be able to communicate with the original team.
Mask-to-radio	This is a higher power wireless communication between the firefighter and the incident commander. The firefighter depresses a large push-to-talk button on the side of the mask unit and speaks into his mask. The radio transmits the message to the department's radio system. In this regard, our system works exactly like the hand-held radios used in the fire service. Firefighters will be identified on the computer screen when talking in Mask-to-radio mode.
<b>Accountability</b>	
Electronic Accountability	When the firefighter first turns on his mask radio, a signal is transmitted to the MaskCom® System computer. This signal is unique to each mask unit. The computer matches the signal to its database and displays the firefighter's name on the computer screen. In this way the incident commander will know which firefighters are in the building (wearing S.C.B.A.).
Automatic P.A.R. <i>Personal Accountability Report</i>	As soon as the firefighter turns on his MaskCom® unit, the computer will keep track of his time. At a preset interval (determined by each department and usually from every four to every ten minutes) the computer will send a signal to the firefighter asking him to push his press-to-talk button. If the firefighter fails to respond in five seconds, the computer will send another signal. The computer will wait an additional five seconds and signal a third time. If the firefighter fails to respond within five seconds, an alarm will sound at the command post and the firefighter's name will be flashing in red on the computer screen. The incident commander can then call the firefighter on his radio and ask if he is okay. If there is no response the incident commander can then initiate rescue operations.
Manual P.A.R.	While automatic P.A.R. works in the background and is computer controlled, there are times when the incident commander wants to know the status of all firefighters in the building. He will push a large button on the command computer and the computer will immediately signal all firefighters to press their push-to-talk buttons. If any firefighter fails to respond within five seconds, the computer will again send the signal. If the firefighter still fails to respond the incident commander can call him on the radio to check on his status or initiate rescue operations.

<b>Firefighter Safety</b>	
Man-down signal	A firefighter who is lost or trapped can turn his push-to-talk button to send an emergency signal to the computer. The computer will signal a loud alarm and flash the firefighter's name on the screen. In this way the incident command will immediately know that the firefighter is in trouble.
Homing signal	The MaskCom® system provides a homing signal to locate firefighters trapped or lost in buildings. The homing signal can be triggered by the firefighter when he turns his push-to-talk button to indicate a man-down situation, or the computer can trigger it when a firefighter fails to respond to a P.A.R. request.
Motion P.A.S.S.	Each MaskCom® unit contains a motion sensor. Most P.A.S.S. devices are worn on the firefighter's waist and false warnings are common. By placing the P.A.S.S. in the mask unit false warning signals are virtually eliminated. When triggered Safety Tech's P.A.S.S. system will send a signal to the computer. The computer will send a warning tone to the firefighter. If he doesn't move his head within five seconds, the computer will activate the homing signal, sound the alarm on the command console and flash the firefighter's name on the computer screen.
Temperature P.A.S.S.	Today's turnout gear are designed to shield the firefighter from higher and higher temperatures and the firefighter has difficulty knowing how hot his environment really is. The MaskCom® unit contains a temperature sensor that transmits the temperature to the command console. When dangerous heat conditions exist (a combination of temperature and time of exposure) the computer will signal a warning to the firefighter. The temperature for each firefighter will also appear on the computer screen next to his name.
S.C.B.A. time	The computer will keep track of how long each firefighter is wearing his S.C.B.A. mask. These times will appear on the computer screen next to each firefighter. For the first twenty minutes this time will be in green, for the second twenty minutes (second tank) it will be in yellow, for the next ten minutes it will be in red, and following that in flashing red.
Evacuation tone	The incident commander can issue an emergency evacuation by pushing a button on the command console. The computer will send an evacuation tone to every firefighter so they can safely exit the burning structure.
Duration of Fire	The computer will keep track of the duration of the fire (beginning when the department first arrives on the scene) and every ten minutes will announce over the loudspeaker: "The fire is TEN minutes old." "The fire is TWENTY minutes old." "The fire is THIRTY minutes old." Etc.
Outside Temperature	A sensor mounted on the command vehicle will monitor outside temperature (especially important when the temperature is near freezing) and display it on the computer screen. (This feature will NOT be available in the portable command consoles.)

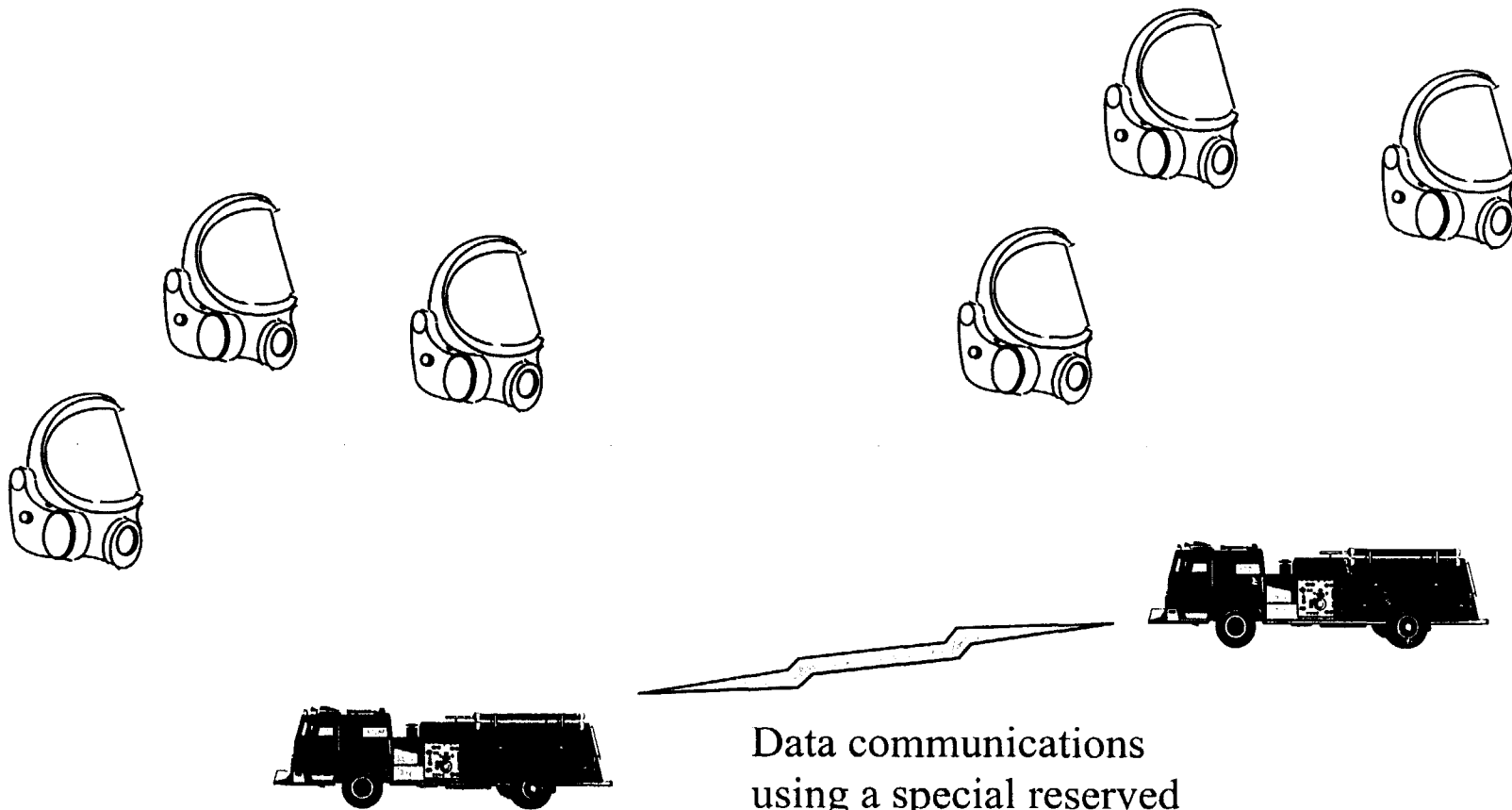
<b>Operating Features</b>	
Unit on light	A red L.E.D. will indicate that the unit is turned on.
Low Battery	When the battery has only thirty minutes of power, the red L.E.D. will begin to blink.
Batteries	The MaskCom® radios can be powered by alkaline batteries (ideal for volunteer fire departments or those with limited S.C.B.A. use) or by rechargeable batteries (ideal for paid departments with heavy S.C.B.A. use).
Console Power	The vehicle installed computer console will be powered by a separate 12-volt battery system. This system is recharged by either running the vehicle or using the vehicle umbilical system attached to a standard 120-volt AC outlet. The portable console is powered by either a 12-volt DC (plugged into a car's cigarette lighter), external 12-volt AC, or internal batteries (recharged by either of the above two methods).
Firefighter clear	Firefighters simply press the press-to-talk button twice rapidly to indicate that they are clear of the building and about to remove their S.C.B.A. This action will signal the computer and ten seconds later turn off the MaskCom® unit.
Fire Report	All data generated during an incident is stored in the computer. The incident commander can request an incident report using one of the computer's function keys. The report will be sent to a disk and can then be printed out back at the fire station. The data includes the following: Time alarm received, time of arrival, time that each firefighter turned on his MaskCom® unit, times he used the push-to-talk button, times of P.A.R., temperatures every minute, length that he had the MaskCom® unit on (time wearing the S.C.B.A.), etc.
Voice Recording	All Mask-to-Radio and Radio-to-mask communications will be recorded at the command console. In this way the incident commander can review all communications after the fire. This is a real-time recording system rather than a system that stops between communications. This will enable the person reviewing the tape to get a better appreciation for time between communications. This feature will NOT be available in the portable command console.



Mask-to-Mask  
VOX communications

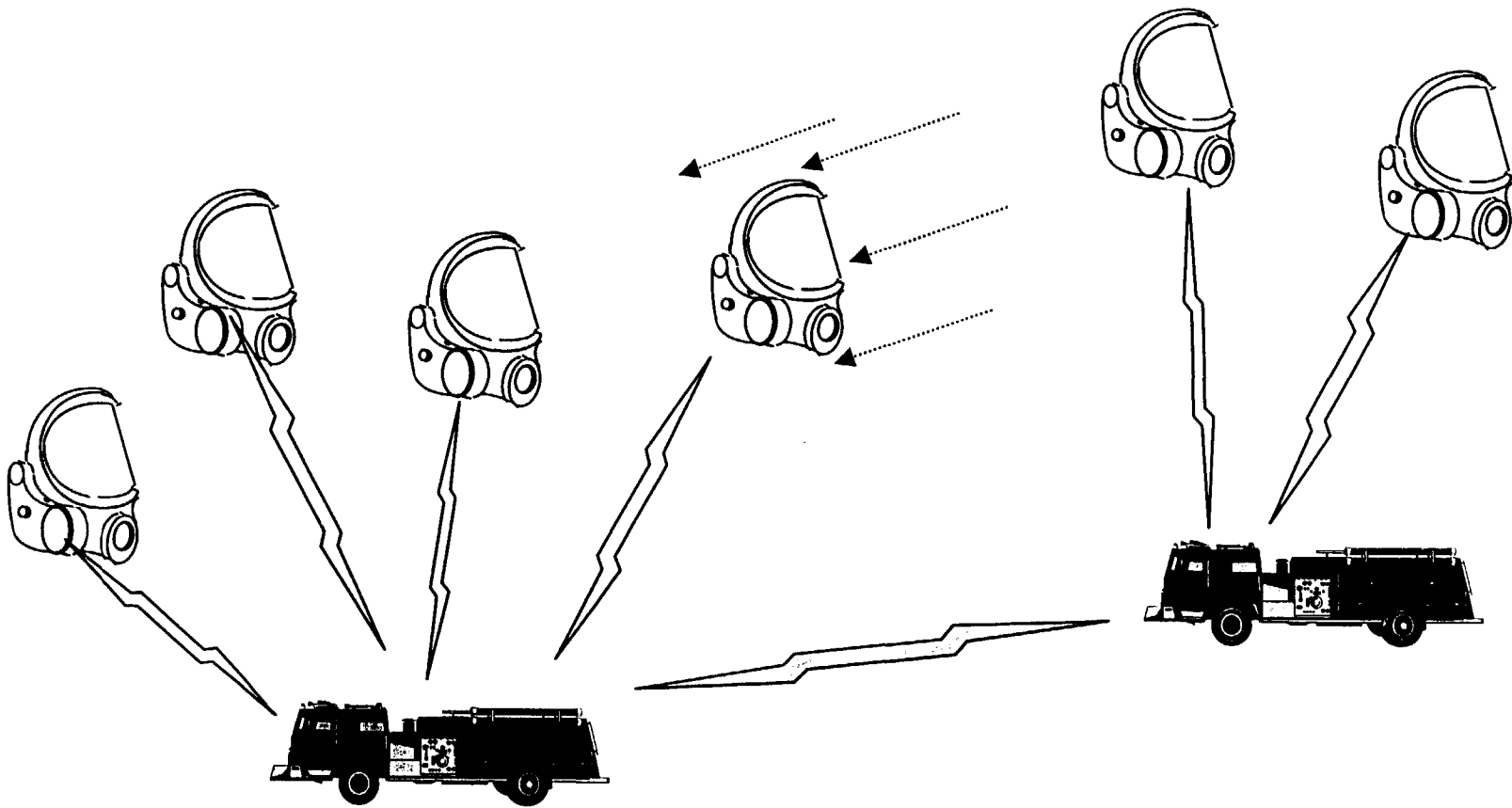




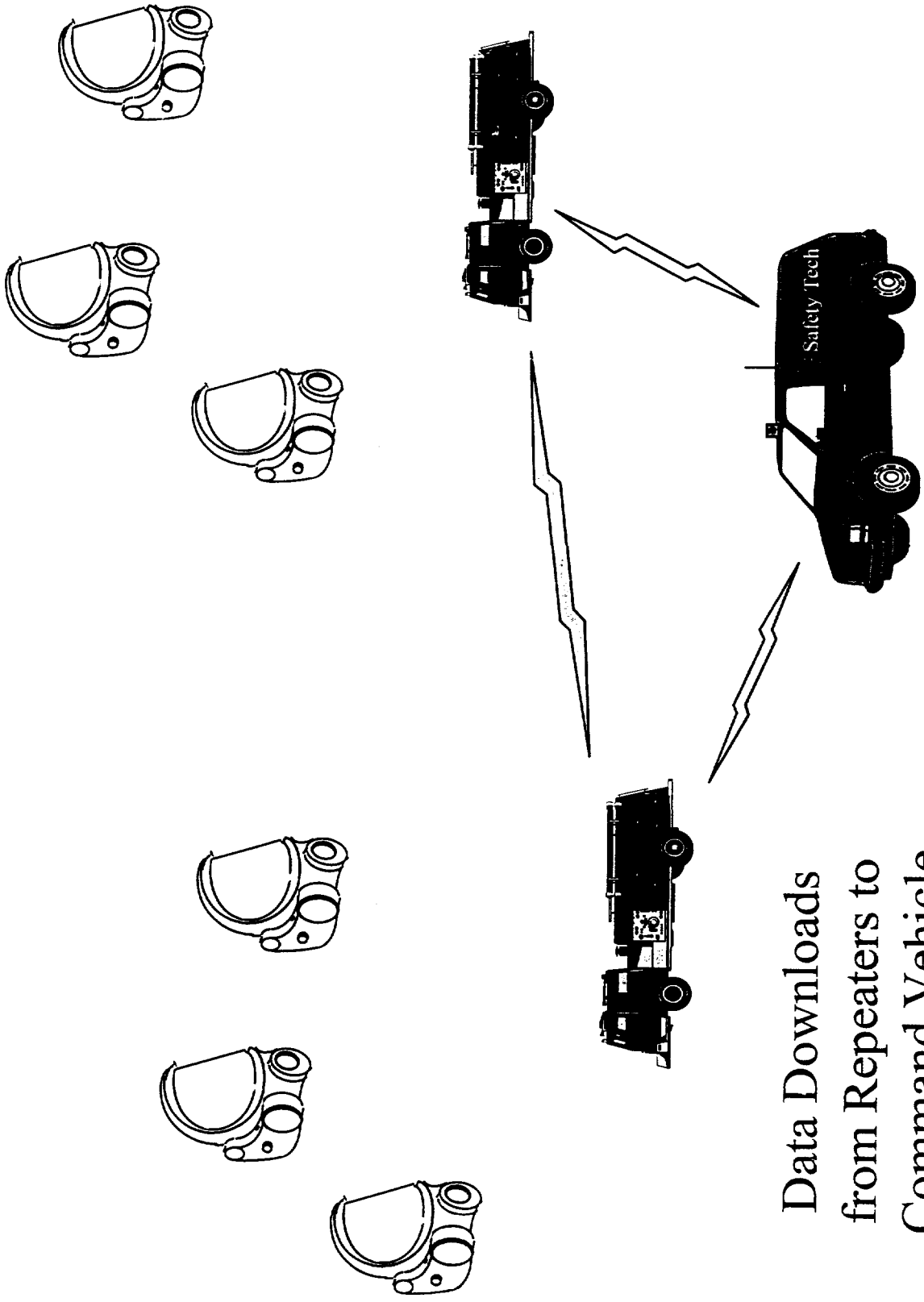


Data communications  
using a special reserved  
frequency in the 746-806  
band

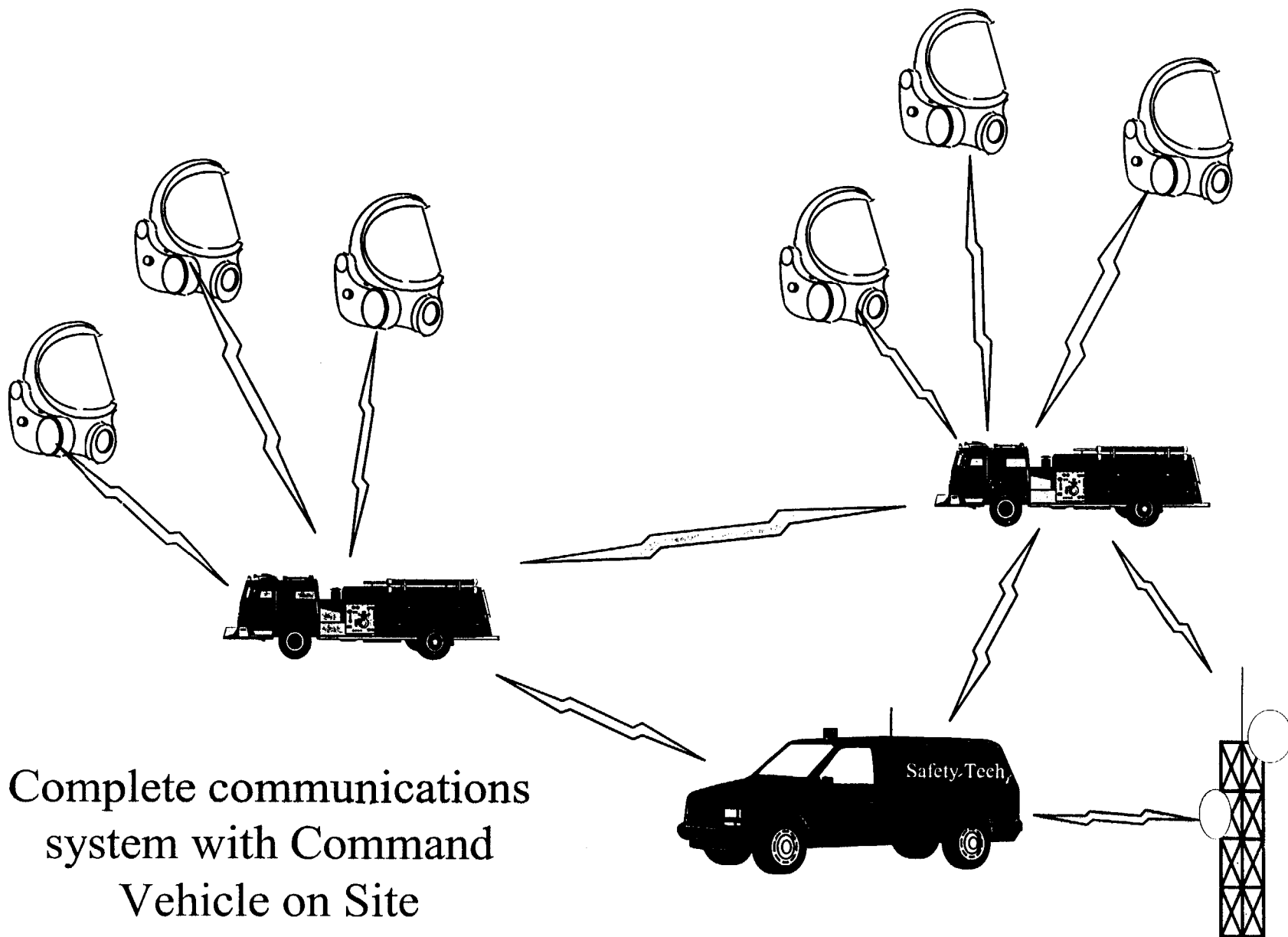
## Repeater-to-Repeater Data Communications

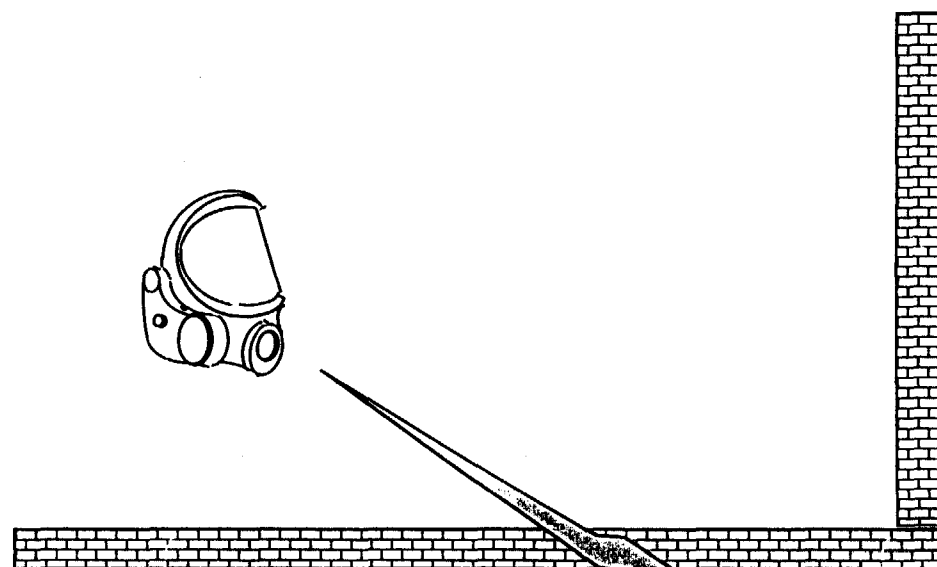


Repeater Assignment  
Depends on Strength of Signal



Data Downloads  
from Repeaters to  
Command Vehicle





Low-Power  
special frequency  
signal

Emergency Man-Down  
or Homing Signal

